REMARKS

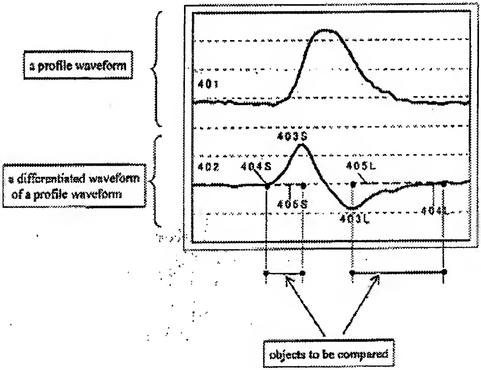
Claims 1-11 have been canceled. Claims 12-18 have been added and are currently pending in this application. Applicants reserve the right to pursue the original and other claims in this and other applications. Applicants respectfully request reconsideration in light of the following remarks.

Claims 1-11 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Dudley et al. (U.S. Patent No. 6,627,887) ("Dudley"). For clarity, claims 1-11 have been canceled and have been replaced with claims 12-18. Thus, this rejection is discussed with respect to the language of claims 12-18. This rejection is respectfully traversed and reconsideration in respectfully requested.

Independent claims 12 and 14 each recite a "method of determining a concavity or a convexity of line and space patterns of a sample, the line and space patterns being arranged alternately on the sample," including the steps of "scanning the line and space patterns on the sample with a charged particle beam," "forming a profile waveform based on charged particles emitted from the scanned portion of the sample" and "forming a derivative waveform of said profile waveform." The method of claim 12 further includes the steps of "comparing a first distance between zero (flat line) and a positive peak of said derivative waveform generated on one of the right and left sides of each peak position of said profile waveform with a second distance between zero (flat line) and a negative peak of said derivative waveform generated on the other of the right and left sides of each peak position of said profile waveform" and "determining, referring to a region between adjacent peak positions of said profile waveform, a region of the sample corresponding to a region of the derivative waveform having a pair of longer distances of the compared first and second distances of said derivative waveform to be the line pattern, and determining a region of the sample corresponding to a region of the derivative waveform having a pair of shorter distances of the compared first and second distances of said derivative waveform to be the space pattern." The method of claim 14 further includes the steps of "comparing the magnitudes of evaluation values obtained from a positive peak and a negative peak of said derivative waveform, said positive peak and negative peak being generated on the right and left sides of each peak of said profile waveform" and "determining, referring to a region between

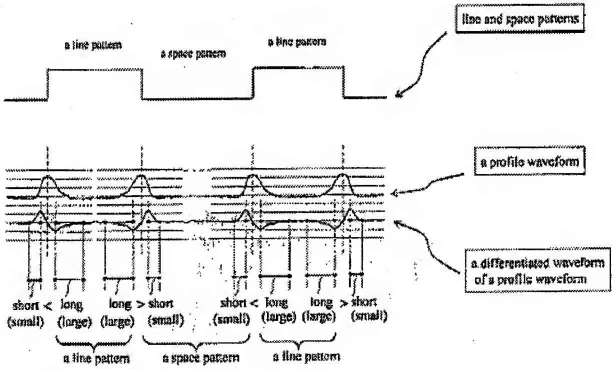
adjacent peak positions of said profile waveform, a region of the sample corresponding to a region of the derivative waveform having a pair of larger evaluation values of the compared evaluation values to be the line pattern, and determining a region of the sample corresponding to a region of the derivative waveform having a pair of smaller evaluation values of the compared evaluation values to be the space pattern."

According to the disclosed embodiments, the properties of the derivative waveform profile can be used to determine the line and space pattern of the sample to which the derivative waveform profile corresponds. The distance between zero (flat line) and a pair of positive and negative peaks of a derivative waveform of a profile waveform are compared in order to make this determination. The positive and negative peaks are generated corresponding to each single peak of the profile waveform. The annotated version of FIG 4 shown below illustrates an example segment of a profile waveform (e.g., such as that in FIG. 3C), corresponding segment of a derivative waveform and the objects to be compared (e.g., the "first distance" and "second distance" or "evaluation values").



In other words, a comparison is made between the evaluation value 405S acquired from the positive peak and the evaluation value 405L acquired from the negative peak. See, Specification, page 6, lines 6-28.

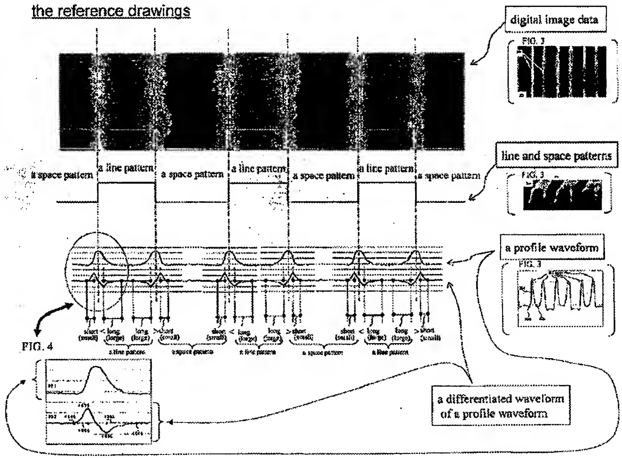
Further according to the disclosed embodiments, the portions of the differentiated waveform in which adjacent evaluation values are the "larger evaluation values" (e.g., a "pair of longer distances of the compared first and second distances") are determined to correspond to the portion of the sample that is the line pattern. The portions of the differentiated waveform in which adjacent evaluation values are "smaller evaluation values" (e.g., a "pair of shorter distances of the compared first and second distances") are determined to correspond to the portion of the sample that is the space pattern. An example of a sample including line and space patterns, a profile waveform and a differentiated waveform are illustrated below.



The method disclosed in Dudley, on the other hand, is for determining dimensions of a profile of a structure in an integrated circuit (col. 1, lines 53-55) and for determining whether these

dimensions or cross section of the profile meet acceptable standards (col. 4, line 26). However, these measurement objects are known in advance to be convex structures; the method of Dudley is not able to distinguish between a concave portion and a convex portion in a pattern. As noted above, however, it is an object of the claimed invention to accurately distinguish between the line and space patterns on a sample, e.g., to determine which portions of the sample are a line pattern and which are a space pattern.

In the derivative waveform of the profile waveform for the line and space patterns as claimed, a single positive peak and single negative peak are generated. This pair of peaks (positive and negative) of the derivative waveform correspond to a single peak of the profile waveform. See, for example, the reference drawing included below.



As previously discussed, according to the claims, the concavity of convexity of a portion of the sample is determined based on the peaks of the corresponding portion of the derivative waveform.

Dudley, on the other hand, measures the dimensions of a single convex portion, whose shape is known in advance. A derivative waveform of a profile waveform of Dudley is illustrated in Fig. 3A (reproduced below for convenience) differs from the derivative waveform of the profile waveform of the claimed invention (reproduced above).

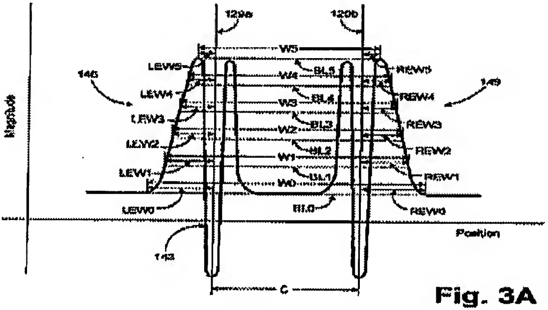


Fig. 3A

Accordingly, Dudley does not disclose, or render obvious, either the "comparing" or "determining" steps as set forth in each of claims 12 and 14. Further, it should be noted that, when a sample to be measured has line *and* space patterns, a first derivative waveform obtained from such sample will not become the waveform as illustrated in Fig. 3A of Dudley. Applicants respectfully request that the rejection be withdrawn and the claims allowed.

In view of the above, Applicants believe the pending application is in condition for allowance.

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Respectfully submitted,

By Jennifer M. McCue

Mark J. Thronson
Registration No.: 33,082
Jennifer M. McCue
Registration No.: 55,440
DICKSTEIN SHAPIRO LLP
1825 Eye Street, NW
Washington, DC 20006-5403
(202) 420-2200
Attorneys for Applicants